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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/815,022	03/31/2004	Kutay F. Ustuner	2003P18618US	1005

7590 09/30/2009

Siemens Corporation
Intellectual Property Department
170 Wood Avenue South
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EXAMINER	
CHAO, ELMER M	
ART UNIT	PAPER NUMBER
3737	

MAIL DATE	DELIVERY MODE
09/30/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/815,022	USTUNER ET AL.	
	Examiner	Art Unit	
	ELMER CHAO	3737	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 August 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,6-12,14-22 and 24-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6-12,14-22 and 24-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8/14/2009 has been entered.

Claim Objections

2. **Claims 12 and 26** are objected to because of the following informalities:

Claim 12, line 2 should recite “configured” instead of “configure”.

Claim 26 doesn’t set forth any further structure. The second spatial resolution is already set to be higher than the first spatial resolution in claim 18 (claim 18 states that the second spatial resolution is set to be higher than [1/1] of the first spatial resolution, so it already exceeds 1/3 of the first spatial resolution).

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claims 1, 2, 4, 7-12, 15-18-22, and 24-29** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hossack et al (US5873830) in view of Smith et al (US 6241675).

Regarding **claims 18, 19, 26, and 27,** Hossack et al. teach scanning an outer region with a first spatial resolution and scanning an inner region with a second spatial resolution higher than the first spatial resolution (see abstract, lines 2-5) within the same imaging session (see col. 6, lines 1-5, refer to "real-time"); generating a first and second representation from the first and second scanning regions, respectively (refer to "real-time"; fig. 6, item 685; fig. 5; fig. 2, item 230; fig. 3, item 360); and that the regions can be three dimensional sub-volumes (col. 16, lines 44-47). Hossack et al. also discloses different lateral and angular ranges between different regions of an interleaved (composite, column 2, line 41) ultrasound image (first and second sets of different imaging parameters, column 2, lines 45-65).

Arguably, Hossack et al. may fail to teach scanning within a three dimensional sub-volume. Smith et al discloses scanning within a three-dimensional sub- volume. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify Hossack et al. to scan within a three-dimensional sub-volume, as taught by Smith et al, in order to provide the operator with a clearer view of the underlying anatomy. Furthermore, using higher spatial resolution in the sub-volume than in the volume is an obvious modification in order to distinguish fine anatomical detail within the sub-volume and coarse anatomical detail within the volume.

Regarding **claims 20-22**, Hossack et al. teaches the inner region being a smaller lateral range than the outer region (see at least col. 6, lines 41-58, refer to the use of scan lines inside and outside the regions of interest).

Regarding **claims 1, 2, 11, and 12,** Hossack et al. teach that the first and second scannings can be a volume and sub-volume, respectively (col. 16, lines 44-47). A scanning involving a 3D volume would involve at least one scanning along a 2D plane.

Regarding **claim 7, 15, 24, and 28**, and as applied to claim 18 above, Hossack et al. teach setting the sub-volume size as a function of user input (col. 2, lines 56-65).

Regarding **claim 8-10, 16, 25 and 29**, Hossack et al. teach the parameters being different for the volume and sub-volume (col. 2, lines 30-53).

Regarding **claim 17**, the steering angle would be determined by the control unit and determined based on the user-defined region of interest.

Regarding **claim 4,** Hossack et al. teach different lateral and angular ranges between different regions of an interleaved (composite, column 2, line 41) ultrasound image (first and second sets of different imaging parameters, column 2, lines 45-65). It would have been obvious to a person having ordinary skill in the art at the time the invention was made to use different lateral and angular ranges for different parts of an interleaved (composite) image in order to improve spatial and/or temporal resolution inside a region of interest, as taught by Hossack et al (see abstract).

5. **Claims 3, 6, and 14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hossack et al. in view of Smith et al. as applied to claims 1 and 10 above, and further in view of Robinson et al (US6582367).

Regarding **claim 3**, Hossack et al. and Smith et al. teach the limitations as discussed above but fail to explicitly teach scanning over a 90 degree sector region. Robinson et al further discloses scanning over approximately a 90 degree sector (Figures 11 and 12). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to include scanning over approximately a 90 degree sector in order to adequately scan an entire region of interest (for motivation see at least fig. 11 & 12).

Regarding **claims 6 and 14**, Hossack et al. and Smith et al. teach the limitations as discussed above but fail to explicitly teach using a B-mode display for the two-dimensional image and using a color Doppler display for the three- dimensional image. Robinson et al. teach that the two-dimensional and three-dimensional images may be obtained using B-mode and Doppler processing (The beamformed signals are B mode or Doppler processed by a signal processor (206), column 7, line 5-6) and that the modes used for the two images may be different (three-dimensional harmonic image ... and two dimensional Doppler flow image, column 6, lines 66-68 and column 7, line1), and that color Doppler mode may be used (Doppler ensembles for colorflow processing, column 8, line 57). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify Robinson et al. to use a B-mode display for the two-dimensional image and to use a color Doppler display for the

three- dimensional image because the color Doppler display is necessary to accurately visualize flow directions in three dimensions and the B-mode display is sufficient to distinguish gross anatomical features in the vicinity of the vasculature being imaged in three dimensions.

Response to Arguments

6. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

7. Regarding the Applicants' arguments with respect to claim 18, Applicants argue that the combination of Robinson et al., Hossack et al., and Smith et al. do not teach scanning a volume at a lower resolution and scanning as sub-volume of the volume at a higher resolution (page 9, third paragraph - end of page, Arguments). Examiner first notes that the rejection above has been modified to use Hossack et al. as the primary reference. Hossack et al. by itself teaches these limitations (see at least fig. 2, refer to box 220). Hossack et al. may not explicitly state that the outer and inner regions are *scanned* per se (emphasis added), however this is inherent as would be understood by one of ordinary skill in the art given that the imaging parameters chosen for each the outer and inner regions would not be effective unless scanned after the selection of the parameters. Also refer to Hossack et al., col. 6, lines 1-5, refer to "real-time". Regarding the limitation "higher spatial resolution", Examiner notes that Hossack et al. also teach this at least in the abstract (refer to lines 2-5, "higher spatial/and or temporal resolution inside a region of interest"). Applicants argue that there is no teaching to use

higher sub-volume (page 9, second to last paragraph, Arguments) and none of the references show 3D representations for both the volume and sub-volume (page 10, first paragraph, Arguments). Examiner notes that Hossack et al. explicitly teach that the method as applied on 2D ultrasound can also be applied in a three-dimensional volume scan (see col. 16, lines 44-47).

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ELMER CHAO whose telephone number is (571)272-0674. The examiner can normally be reached on Mon-Thurs 11am-9pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Casler can be reached on (571)272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/BRIAN CASLER/
Supervisory Patent Examiner, Art Unit 3737

/E. C./
Examiner, Art Unit 3737